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Asotana magnifica n. sp. (Isopoda, Cymothoidae) an unusual Parasite (Commensal?) of the buccal Cavities of Piranhas (*Serrasalmus* sp.) from Roraima, Brazil

by

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Abstract

Asotana magnifica n. sp. (Isopoda, Cymothoidae) is described from the buccal cavities of piranhas (*Serrasalmus* sp.) from the Territory of Roraima, Brazil. The species was based on two adult females and an additional aberrant female was also studied. A table compares the new species with the two species already known in this genus. Distinguishing characters of the new form are: the shape of the body, which narrows abruptly at the abdomen; the pereonite 2 without tubercles; the merus of pereopod 7 with two bosses and the antenna of 5 segments. These isopods are not pathogenic and it is thought that they feed on already digested material regurgitated periodically by the host. It is suggested that for this reason, and in spite of their large size, they might be commensals rather than parasites. This is the third report of this genus and the first for Brazil.

Keywords: **Isopod, cymothoid, mouth parasite, mouth commensal, piranha.**

Resumo

Asotana magnifica n. sp. (Isopoda, Cymothoidae) das cavidades bucais de piranhas procedentes do Território de Roraima, Brasil, é descrita. A espécie é baseada em duas fêmeas adultas normais e uma fêmea aberrante também foi estudada. Uma tabela compare a nova espécie com as duas espécies já conhecidas neste gênero. Algumas carateres que distinguem a nova espécie são: a forma do corpo, o que se estreita abruptamente ao nivel do abdome; o pereonito 2 sem tubérculos; o mero do pereópodo 7 com duas projeções e uma antena de 5 segmentos. Estes isópodos não são patogénicos e acredita-se que se alimentam de material já digerido que seja periódicamente regurgitado pelo hospedeiro. É sugerido que por isto, e a pesar do tamanho grande que atingem, eles poderiam ser comensais em vez de parasitas. Isto é a terceira citação do gênero e a primeira vez para o Brasil.

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Introduction

Asotana has been found only twice in the last 108 years. The genus was described by SCHIÖDTE & MEINERT (1881) and was based on a single female from an unidentified fish from Peru. They named the species *Asotana formosa*. Another single female was described by LEIGH-SHARPE (1937) from an unidentified host of Ecuador. He thought he was looking at a new genus and species, so he called it *Badroulboudour splendida*. MONOD (1937) observed the similarities in the two descriptions and placed the latter generic name in synonymy with the former. He also suggested that both specimens might belong to a single species. LEMOS DE CASTRO & LOYOLA E SILVA (1985) did not list this genus for Brazil. The present study is based on three females of *Asotana* from the mouths of piranhas (*Serrasalmus* sp.) from the Brazilian Territory of Roraima. These specimens are herein described as a new species and the genus is redefined.

Material and Methods

Fish were caught with nets, killed and fixed in 10 % formalin solution and later transferred to 70 % alcohol. The isopods were removed from the fish and stored in 70 % alcohol. Appendages were dissected from one specimen and preserved as permanent microscope slides. The appendages were stained in 95 % alcohol containing Eosin and Orange G, dehydrated in pure phenol, cleared in methyl salicylate and mounted in Canada balsam. Drawings were made with the aid of a camera lucida and by projection of photographic negatives. Measurements on scale lines are indicated as either millimeters or micrometers (μm).

Systematic Section

Isopoda
Flabellifera
Cymothoidae
Asotana SCHIÖDTE & MEINERT, 1881

Diagnosis (emended): Cymothoidae. Female: Body large, elongate, slightly convex, cream to straw colored with sparse black pigment spots dorsally. Head large, subrectangular, not deeply immersed, keeled dorsally and with two pairs of dorsolateral tubercles; frons curved downward and terminating in three rounded bosses. Mandibles provided with anteroventral bolsters; second maxillae without hooks. Pereonite 1 with brown or black roughened patches of denticles dorsally. Pereopods short, slender, subequal in length; first 6 pairs of dactyls larger than 7th. Abdomen inserted at its base. Uropods short and wide. Pleotelson tongue or shield-shaped, medially keeled and inflated. Parasites or commensals of buccal cavity of freshwater fish.

Male: Unknown.

Type species: *Asotana formosa* SCHIÖDTE & MEINERT, 1881

Other species: *Asotana splendida* (LEIGH-SHARPE, 1937)
Asotana magnifica n. sp.

Asotana magnifica n. sp.
(Figs. 1 - 23)

Host: *Serrasalmus* sp., Serrasalmidae, "piranha"
(The ichthyologists consulted were unable to identify the species, but said it is similar to *S. gibbus*).

Site: Buccal cavity.

Locality: Uraricoera River, Maracá Island, Territory of Roraima, Brazil.

Holotype (female): Crustacean collection, "Instituto Nacional de Pesquisas da Amazônia" (INPA), Manaus, AM, Brazil.

Paratype (female): Crustacea collection of INPA. (An abnormal female, which was not used for the description, is also on deposit).

Male: Unknown.

Species diagnosis (based on two normal females):

Body (Figs. 1, 6 & 21) large, somewhat flattened, slightly convex, sides of thorax nearly parallel, narrows abruptly to abdomen the sides of which are also nearly parallel.

Head (Figs. 3, 4, 5 & 8) slightly immersed in pereonite 1, subrectangular, supraocular tubercles flattened, preocular tubercles pointed, eyes small, oval; frons depressed ventrally, splayed near tip, terminating in three rounded bosses which end in roughened russet areas.

Antennule (Fig. 7) short subcylindrical; 4-segmented.

Antenna (Fig. 9) longer than antennule, slightly compressed; 5-segmented.

Mouthparts: mandible (Fig. 15) with masticatory plate, ventral bolster and 3-segmented palp; maxillule (Fig. 16) with two apical and 3 subapical hooks; maxilla (Fig. 17) without hooks; maxilliped (Fig. 18) with plumose setae laterally.

Thorax (Figs. 1 & 21): pereonite 1 slightly longer than 2, with irregular roughened denticles; pereonite 7 shorter than 6, with rounded posterolateral lobes.

Pereopods: subequal in length; dactyls 1, 2 & 6 larger and more robust than dactyls 3, 4 & 5; dactyl 7 small, slender, about one-third the size of 1. Pereopods 1 & 2 without spinules (Fig. 12); 3, 4 & 5 with small patches of spinules medially on propus (Fig. 13); 6 with spinules on propus and carpus (Fig. 14); 7 with spinules on propus, carpus and merus, latter with two prominent bosses (Fig. 11).

Abdomen (Figs. 1 & 6): base inserted, pleonite 1 partly or completely covered by pereonite 7.

Uropods (Fig. 10): basipod short, flattened, subrectangular; rami subequal in lingth; exopod flattened, subrectangular; endopod flattened, rounded in outline; both rami with terminal fringe of plumose setae.

Pleotelson (Figs. 1, 6 & 21): tongue or shield-shaped, inflated anteriorly and strongly keeled.

Discussion

Both MONOD (1937) and TRILLES (1973) considered *Asotana splendida* (LEIGH-SHARPE 1937) a probable synonym of *A. formosa* SCHIÖDTE & MEINERT, 1881. Although the descriptions of these species are lacking in detail, they are clearly different and therefore valid. As indicated in Table 1, the two species have entirely different body shapes and the number of segments in both antennule and antenna also differs. In the same table, the characteristics of *A. magnifica* n. sp. are also shown. In this species, the sides of the thorax are nearly parallel and then the body narrows abruptly to form the abdomen, which also has parallel sides. In addition, the new species has a pereonite 2 without tubercles, a merus on pereopod 7 with two prominent bosses, and a 5-segmented antenna.

Three female specimens of *A. magnifica* n. sp. were studied and all had oostegites. The first specimen measured 30 x 14 mm and had been taken from the fish and brought in preserved in 70 % alcohol (Figs. 1 - 19). The host was said to have been a "black piranha" more than 30 cm in length. Later, piranhas that had been caught in the same area and preserved in formalin were examined. Two

of 16 fish contained one female isopod each. Specimen 2 (holotype, Figs. 20 - 22) measured 34 x 15 mm and was from a piranha (*Serrasalmus* sp.) that was 19.5 cm long. This female had a marsupium full of undeveloped eggs measuring about 1.2 mm in diameter. Specimen 3 was smaller (29 x 11 mm), abnormal and had apparently died before the fish was caught. The strange elongate shape of this specimen (Fig. 23) may have been caused by the small size (15.5 cm) of the host fish. The mouth of the fish may have been too small to permit normal growth. Perhaps the isopod was crushed when the fish bit down on a bone, or other hard object.

The presence of these isopods produced little gross pathology in the fish. There was a small indentation in the floor of the mouth, as from pressure atrophy, but there was no evidence of an inflammatory reaction. The gills and internal organs were normal. Mesenteric fat bodies were present, though small, and there was no external indication of emaciation.

At first it was thought that an isopod of this size in the buccal chamber might impede the passage of food, but this proved not to be the case. The larger fish (19.5 cm) had a stomach nearly full of pereopods from a small crab. The smaller host (15.5 cm) had a stomach replete with chunks of fish muscle, a piece of fish gill and large fish scales. This indicates that the isopods neither blocked the esophagus nor interfered with the swimming ability of the hosts.

These observations naturally give rise to certain questions. Why were no males present? What do these isopods eat? The most reasonable answer to the first question is that these hosts happened to be too small to provide space enough for pairs of isopods. It is also possible that fecundation of the female could occur before she enters the host. This seems unlikely, however, since other genera of isopods are frequently seen paired in the hosts. As to what they eat, the anterior ends of these isopods were covered with an amorphous and acellular material. The position of both isopods was with the head near the entrance to the esophagus of the host (Fig. 20). The acellular material must have been digested food from the host's stomach. The horns and tubercles on the head and first pereonite of the isopod may serve to irritate the host's esophagus and provoke periodic regurgitations of digested food. If these assumptions are correct, we might have to consider these isopods commensals rather than parasites.

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References

LEMOS DE CASTRO, A. & J. LOYOLA E. SILVA (1985): 33. Isopoda. **In:** *Manual de Identificacao de Invertebrados Limnicos do Brasil* (R. Schaden, Organizer).- CNPq, Brasilia. 10 pp.

LEIGH-SHARPE, W. H. (1937): *Badroulboudour splendida* n. g. et sp., a new parasitic isopod from Ecuador.- Parasitol. **29:** 391 - 394.

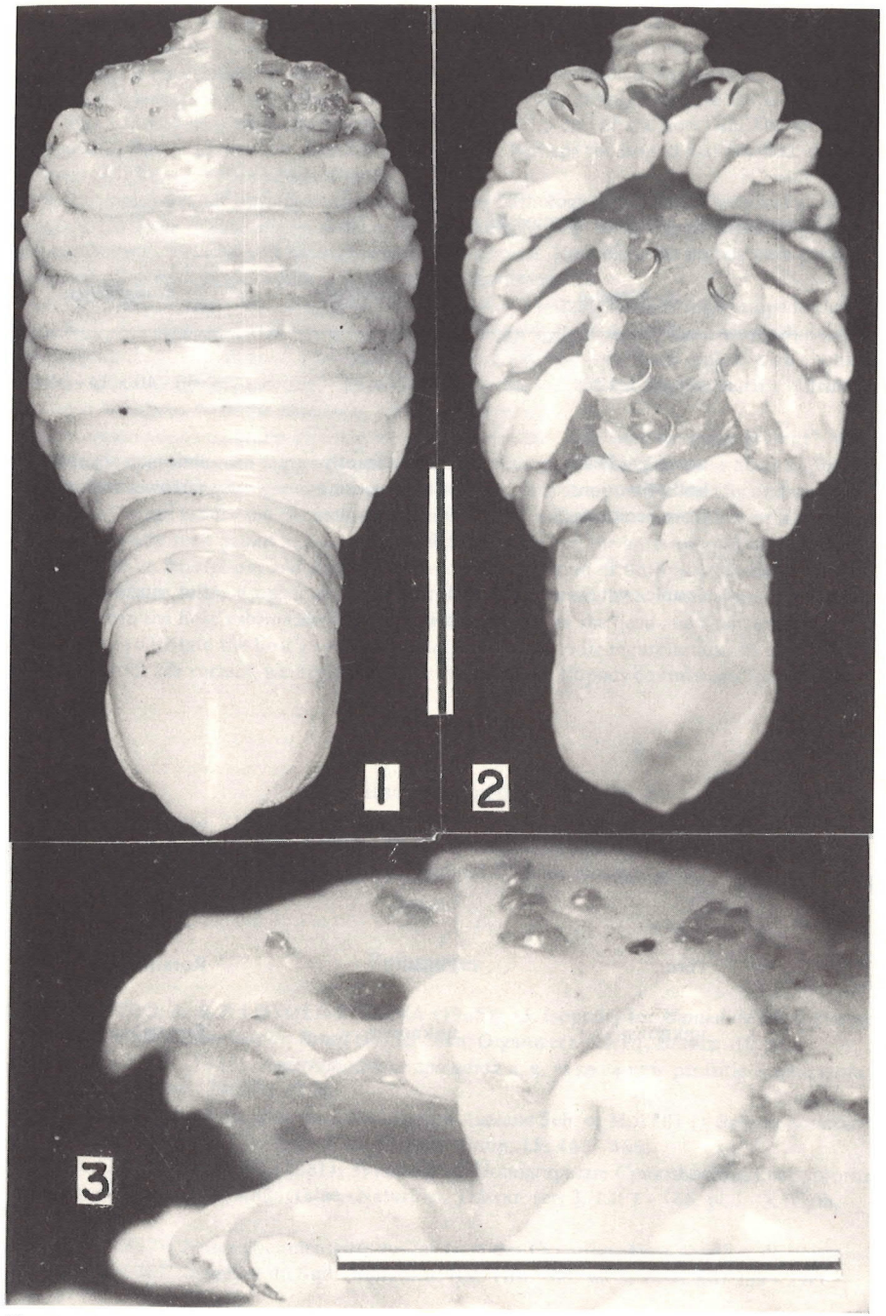
MONOD, T. (1937): Sur un Isopode parasite du genre *Asotana* Sch. et M. 1881 (= *Badroulboudour* W. H. Leigh-Sharpe 1937).- Ann. Parasit. Hum. Comp. **15:** 465 - 466.

SCHIÖDTE, J. C. & F. MEINERT (1881): Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae. II. Anilocridae.- Naturhist. Tidsskr. ser. 3. **13:** 1 - 166. pl. I - X (Cym. VIII - XVII).

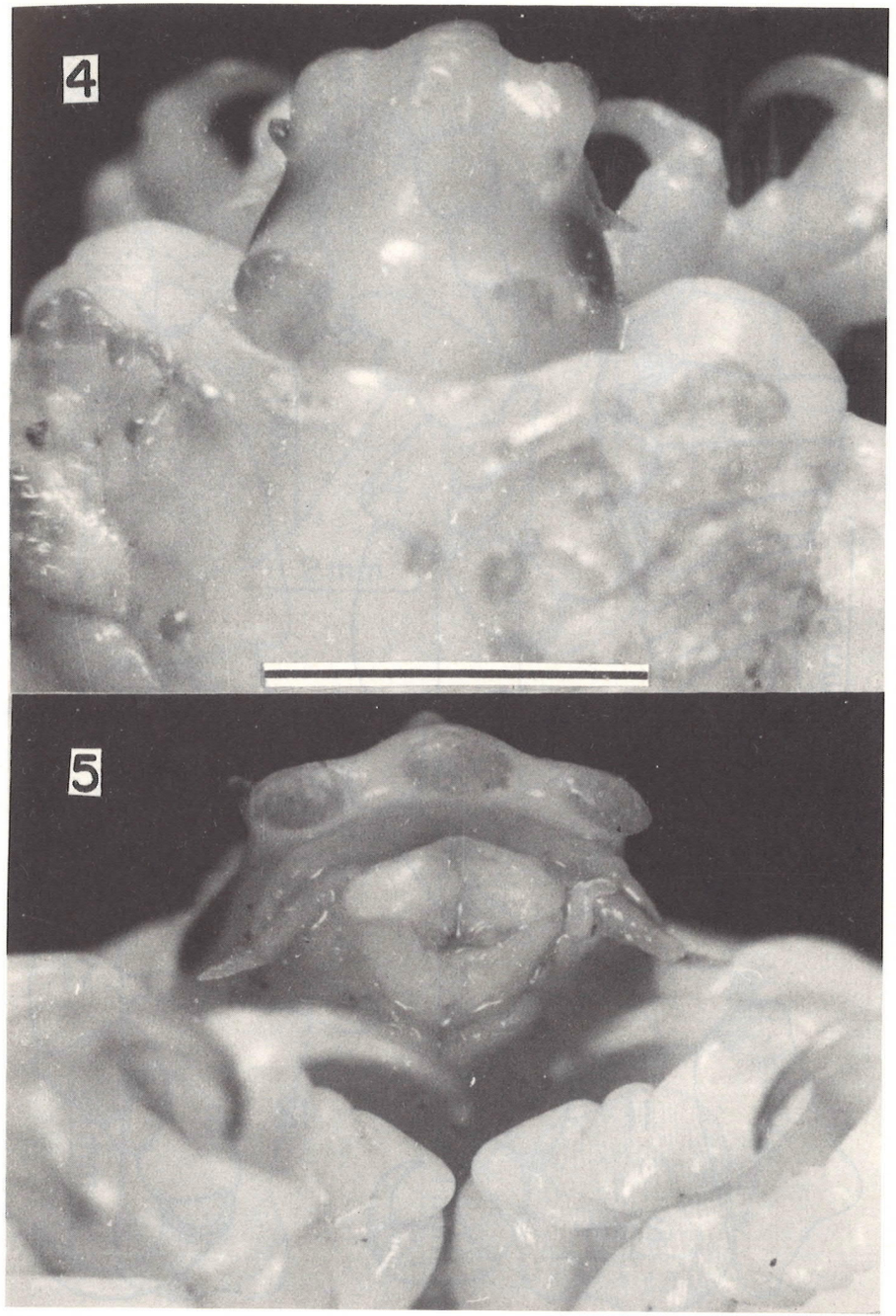
TRILLES, J. P. (1937): Notes documentaires sur les Isopodes Cymothoadiens parasites de poissons d'eau douce de l'Amérique du Sud.- Bull. Mus. Nat. Hist. Nat. ser 3. Zool. **88:** 239 - 270 (pl. I - II).

Table 1: Characteristics of three species of *Asotana*

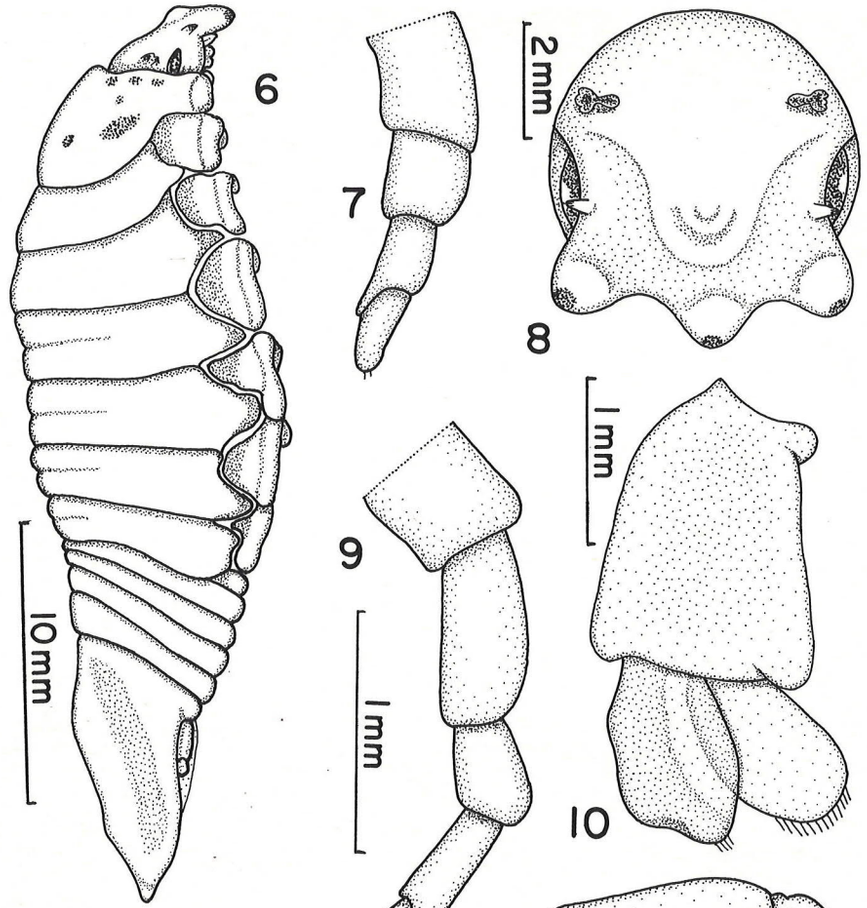
Character	*A. formosa*	*A. splendida*	*A. magnifica*
Length-width (mm)	30 x 12	21 x 11	30 - 40 x 14 - 15
Body shape	tapers gradually both directions from pereonite 5	tapers abruptly both directions from pereonites 3 & 4	abdomen abruptly narrower than thorax
Head tubercles	double over eyes	double and pointed over eyes	flat, single or double
Antennule (segments)	8	4	4
Antenna (segments)	9	7	5
Pereonite 2	with tubercles	with tubercles	without tubercles
Pereopod 7	not known	merus without bosses	merus with 2 bosses
Collection Locality	Peru	Ecuador	Roraima, Brazil
Host	unknown	unknown	*Serrasalmus* sp.

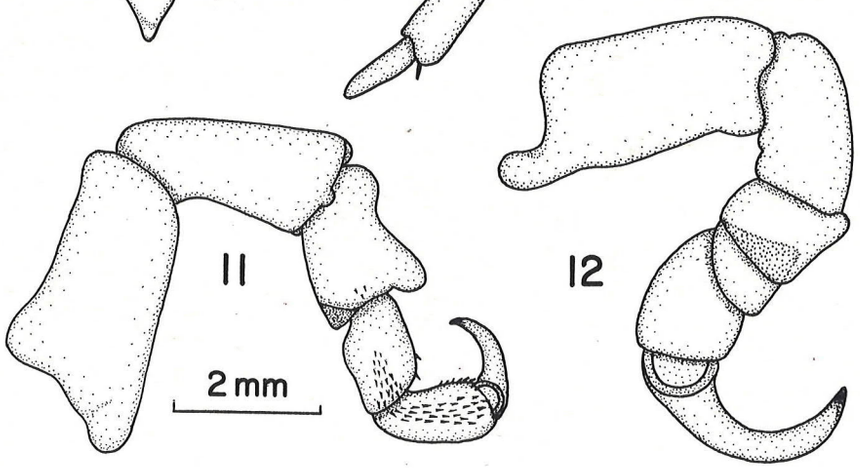


Figs. 1 - 3:
Asotana magnifica n. sp. (female)
1. Entire specimen (dorsal, scale = 10 mm); **2.** Same specimen (ventral, to same scale);
3. Head and pereonite 1 (lateral, scale = 5 mm).

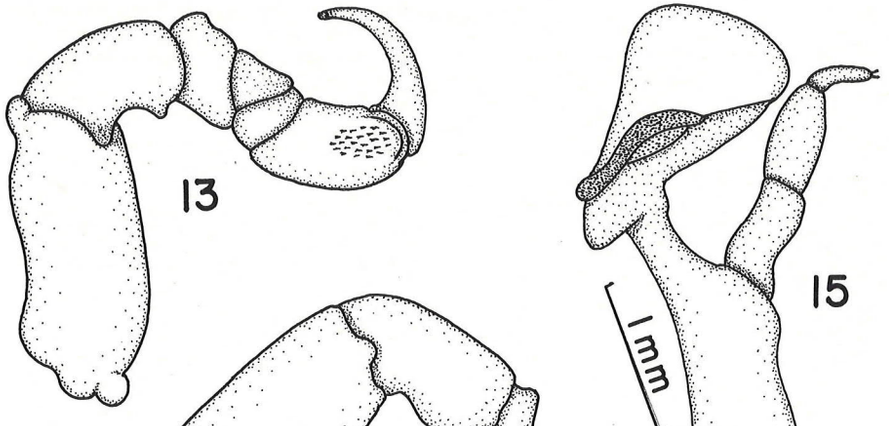


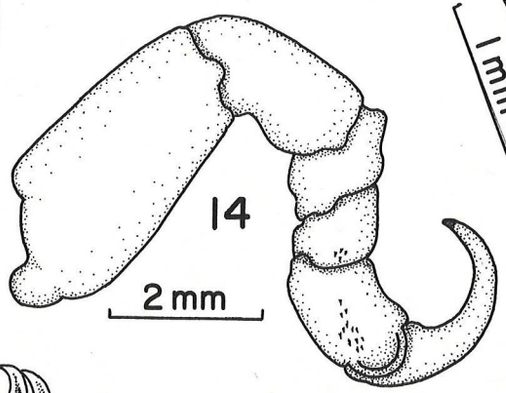
Figs. 4 - 5:
Asotana magnifica n. sp. (female)
4. Head and pereonite 1 (dorsal); **5.** Head (ventral, showing frons, mouth and antennae, scale = 5 mm).

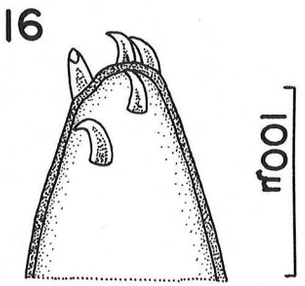


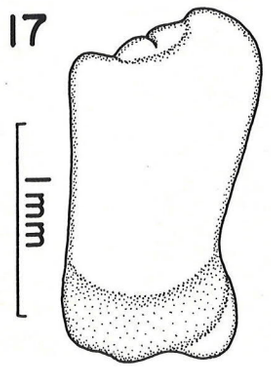


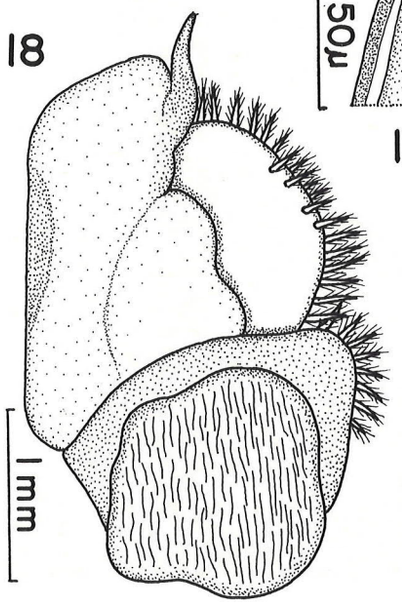
Figs. 6 - 12:
Asotana magnifica n. sp. (female)
6. Body (lateral); **7.** Antennule; **8.** Head (frontal); **9.** Antenna; **10.** Uropod; **11.** Pereopod 7; **12.** Pereopod 1.











Figs. 13 - 19:
Asotana magnifica n. sp. (female)
13. Pereopod 4; **14.** Pereopod 6; **15.** Mandible and palp; **16.** Maxillule (tip); **17.** Maxilla; **18.** Maxilliped; **19.** Maxixilliped (tip of palp).

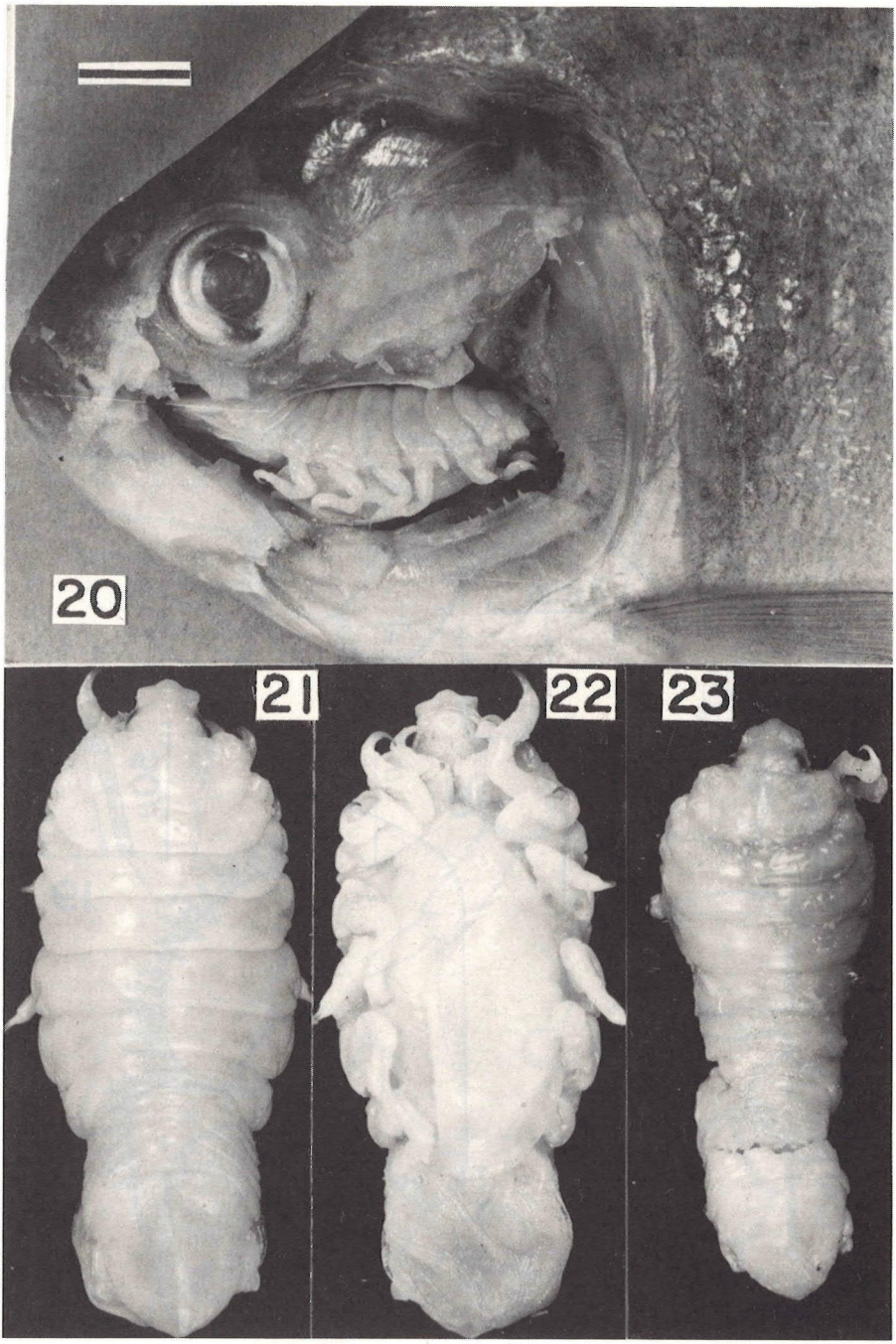


Fig. 20:
Asotana magnifica n. sp. (holotype female in mouth of *Serrasalmus* sp.; operculum and outer gill arches removed

Fig. 21 - 22:
Asotana magnifica n. sp. (holotype, female) **21.** Body (dorsal); **22.** Body (ventral).

Fig. 23:
Asotana magnifica n. sp. (abnormal female)
Scale bars for Figs. 20 - 23 = 10 mm.